

Souping Up Graphics Cards

more speed — by software

By Harry Baggen

To computer game addicts, the GPU and the graphics card in their PCs is invariably too slow. True, many of the latest games place heavy demands on the GPU and the graphics card as a whole. Following the introduction of nVidia's latest speed devil, the GeForce 4, souping up graphics cards has become a popular pastime again.



A long, long time ago (in computer terms, that is...), the sole function of the graphics card was to convert image data into a video format that could be viewed on a monitor. Such functionality now seems antediluvian. These days, graphics cards for home PCs sport a GPU (Graphics Processing Unit) that's more complex than the latest CPU on the motherboard. A lot of special functions and

graphics processing is handled directly by the GPU, without any intervention from the CPU. In this way, it is possible to compute complete shapes, shadows, light effects, etc. at such a speed that smooth motion is perceived on the computer display. This is, of course, essential with many high-end computer

games, which, not surprisingly, typically exploit the power of the modern GPUs to the full. Fond memories, suddenly, of IBM's mid-1980's 'Alley Cat' computer game which could be played using a super-VGA card, DOS, the standard PC loudspeaker and just 250 kB RAM...

The following factors contribute to the computing power of a graphics card: processor speed, memory access speed, and the extra functions squeezed into the GPU hardware (like the number of pipelines available for calculating geometrical shapes). The latter are, of course, beyond our grasp or even control and that is why the sheer computing power of the GeForce 4 can not be matched by its predecessors, the GeForce 2 or 3. Still, there's room for tuning, tweaking or souping up, or whatever computer nerds want to call it.

The GPU and memory clock frequencies are strictly separated and easily modified by writing appropriate data to a couple of graphics card

registers. No hardware mods required! For example, by means of smart software, the GPU clock may be increased from 220 MHz to 250 MHz. Depending on the available cooling capacity and the quality of the components on the graphics card, there's always some headroom which speed tweakers will love to put to the test. If you reach too high, your STOP sign is the screen which will show irregularities in the picture, or even complete absence of an image. In most cases, everything will be all right again if you step the clock down to a lower value. In rare cases, however, components on the graphics board may overheat, causing the whole board to give up the ghost and you can write FUBR on it. Alas, that is the inevitable and well-known risk of overclocking!

As I write this there are only two major manufacturers of graphics processors with 3-D capability, and a handful of 'lesser' competitors in the market. Most games enthusiasts will have a graphics card in their PC based on an **nVidia** processor like the GeForce 2, 3 or 4, or one from **ATI** (Rage, Radeon, 7500, 8500). When searching for tuning tools for graphics cards, in practice the largest part of the market is easily accounted for by concentrating on these two manufacturers. That is not to say that no such tools are available for GPUs from smaller manufacturers, as we will see further on.

Our survey of GPU overclocking tools should start with the familiar **Powerstrip** from the Taiwanese company Entech [1]. This program offers you a vast number of configuration options for the graphics card. It supports several displays and automatically recognizes the features of most graphics cards, from a Matrox Millennium I right up to the very latest Radeon 8500 and GeForce 4. Two slide controls allow you to set the GPU and memory speed separately. The program also allows individual profiles to be created for applications, monitors, colour correction and speed settings. An excellent feature of PowerStrip is that it's also suitable for newcomers to the art of overclocking!

Judging by the abundance of websites exclusively devoted to these cards, GeForce products are

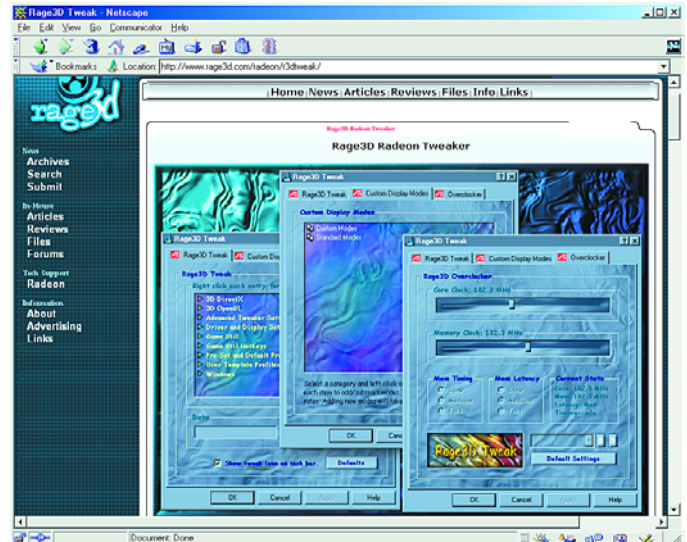
immensely popular and have many staunch supporters. Most of these websites have some kind of download section containing tweaking programs. Because all programs are nearly identical, we can limit ourselves to one of these sites. The **GeForce Zone** website [2] contains a tweaking page listing ten or so overclocking programs including NVMax, Coolbits and Rivatuner, editing tools for the graphics card BIOS and many other bits and bobs.

For ATI cards it's best to go straight to the **Age3D** website [3]. There you will find an Aladdin's Cave of utilities for modern ATI GPUs (roughly anything from the Rage to the Radeon 8500). All the latest drivers and loads of utilities have been brought

together on these pages. Under the heading 'Tech Support' you'll find various tweak utilities like Rage3D Tweak, UniTuner, Radeon Tweaker and RadTweak.

A very cool, stylish page offering a lot of overclocking tools is webbed by German **Grafikkarten Tools** [4]. One or more programs for all famous chips like Voodoo, S3, nVidia, Matrox, ATI and Kyro, may be found here. The same, basically, goes for the **Guru3D** website [5], although this also offers a mass of drivers and test utilities.

The highest speed that can be obtained from a graphics card is often determined by the capacity of the cooling device fitted on the GPU and/or the memory ICs. Intrepid tweakers will not hesitate to add extra cooling here and there, and so squeeze the highest possi-



ble performance from all that silicon on the graphics board. At **Tweak3D** [6] you'll find a rather elaborate description of how this may be done in practice.

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Internet Addresses:

- [1] Powerstrip (shareware):
www.entechtaiwan.com/ps.htm
- [2] GeForce Zone
www.geforcezone.com/tweaks.htm
- [3] Rage3D:
www.rage3d.com/radeon/
- [4] Grafikkarten Tools:
www.grafik.overclocker-tools.de/
- [5] Guru3D:
www.guru3d.com/files/
- [6] Tweak3D: GeForce3 cooling:
www.tweak3d.net/reviews/misc/gf3cooling/